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ABSTRACT

A 38-item Likert-bipolar scale for measuring college students' attitudes toward instructional television (ITV) was constructed and content validated. The scale was administered to a total of 312 students currently enrolled in the various ITV courses at Indiana State University. The test was also factor analyzed to extract the underlying variable (construct). The test reliabilities were computed by the split-half technique and then corrected by the Spearman-Brown Prophecy Formula; they range from 0.96 to 0.99. Since all the 38 items loaded heavily on the first factor (the construct of concern) it can be concluded that the test is factorially "pure" and unidimensional. In addition to this, since many of the items in the test refer directly to attitudes toward ITV, it can be concluded that the underlying factor extracted is relevant to the purpose of the test, and construct validity is thus established. A copy of the scale is appended. (Author/JY)

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Measurement of Attitude Toward Instructional Television

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ABSTRACT

A 38 item Likert-bipolar scale for measuring college students' attitude toward Instructional Television was constructed and content validated by two university professors in Speech. The scale was administered to six different groups of students, altogether 312, currently enrolled in the various instructional television (ITV) courses at Indiana State University, Terre Haute, Indiana. The test was also factor analyzed to extract the underlying variable (construct). Results indicated that the 38-item loaded heavily on only one factor. The computed test reliabilities by the split-half technique and then corrected by the Spearman-Brown Prophecy Formula ranges from 0.96 to 0.99.

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It is generally agreed that students' attitude is an important variable in learning. Remmers (1954:15) commented:

> The realization is rapidly growing that attitudes, the way individuals and group feel about the various aspects of the world, are probably more determinative of behavior than mere cognitive understanding of this world.

Orr (1966) also indicated that the appropriate method of evaluating ITV was to notice the change of students' behavior.

One commercial scale for measuring students' attitude toward ITV is the Purdue Instructional Television Attitude Scale developed in 1958. This scale consisted of 28 items constructed by the Thurstone technique. According to the test manual (Purdue, 1958), the parallel form reliabilities ranged in the mid-80's. However, one possible difficulty of the Purdue Scale seems to be that the students have to check their responses on the test paper and that scoring becomes difficult for large groups of students.

Due to the general lack of commercial scales, researchers in this field often have to construct their own scales. Different techniques for measuring attitude toward ITV have been reported. Some researchers (Neidt & French, 1958; Westley & Jacobson, 1962; Hardaway et al, 1963; Guba and Snyder, 1965) used the Likert technique, others (Macomber & Siegel, 1960; Neidt & Siogren, 1968) applied the Thurstone's scale, and others used Q-sort technique (French, 1963), the Guttman scale (Greenhill & McNiven, 1956) or Osgood's Semantic Differential (Bobren

& Siegel, 1960, a & b; French, 1963). Test reliabilities reported typically range from 0.60 to 0.90, although in some cases the reported reliabilities were much lower.

Greenhill (1967) commented that some instruments were not "sharp" enough to detect significant differences in experimental studies on Instructional Television.

If anything definitive is to be said about students' attitude and Instructional Television, some effort must be put into developing better measuring instruments. This is a report of one effort to develop a more satisfactory measure of students' attitude toward ITV.

Method

The objective of this experimental instrument is to measure consistently and accurately the students' expressed attitude toward ITV. In order to achieve this objective, great care has been exercised to build validity into the test (Ebel, 1965:390).

Before writing the test items, the related literature was first consulted. Content areas pertaining to the students' attitude toward ITV were identified and a table of specification was constructed (Table I). About 60 test items were then written or collected. However, only 38 of them were used in the final test, and the selection of items was based on their relevance and balance in respect to the table of specification and the objective of the test. This process of content validation was cross-checked by two professors of Instructional Television at Indiana State University.

TABLE I

Table of Specification

Content	Number of Items
fondness of ITV	5
ITV effectiveness	3
ITV instructional quality	2
ITV and motivation	2
ITV and learning	7
ITV and social climate	6
ITV and regular class compared	2
expansion of ITV	6
enrollment in ITV	2
encouraging friends to take ITV	3
Total	38

The test was constructed by the Likert-bipolar technique: half of the items were stated positively and half negatively. Agreement to the positively stated items would be evidence of favorable attitude toward ITV, but it would be vice versa for the negatively stated items.

Each statement is followed by five responses, marked as "a," "b," "c," "d," and "e," representing "strongly agree," "agree." "uncertain," "disagree," and "strongly disagree" respectively.

For the positively stated items, marks are assigned as 4, 3, 2, 1, 0, to "a," "b," "c," "d," and "e," respectively. For the negatively

stated items, marks are reversed in the order of 0, 1, 2, 3, and 4. Since there are altogether 38 items, the theoretical maximum mark is 152 and the minimum mark is 0. The higher the score a student has in the test, the more positive is his expressed attitude toward ITV.

Subjects

The subjects used in this present study were drawn from the students enrolled in the various ITV courses at Indiana State University.

About 600 test papers (see Appendix) were mimeographed and they were given to each of the instructors in charge of the various ITV courses. Due to the tight schedules of the various ITV classes, it was impossible to administer the test on the same day by the same person. However, all the students completed the test in their own classrooms on one of the weekdays between April 19 and May 6, 1971.

The number of students who took part in the test varied from course to course. The reason was that some ITV courses have many more students than others.

A total of 332 answers were returned from the various ITV instructors. However, some of the students had omitted a large part of the answers, and so only 312 of the replies were used in the final analysis.

All answers in this study were scored electronically by the IBM 360/40 of the Indiana State University Computer Center.

Reliability

Reliability and other test statistics were electronically computed for the returns from each of the six ITV courses and also for all the courses combined. All the essential results of the test are tabulated in Table II.

The computed test reliabilities range from 0.96 to 0.99, with the overall test reliability for all the students combined to be 0.98. Since the K-R 20 and K-R 21 formulae cannot be applied to the scale used in this test, reliability was computed only by the split-half technique and then corrected by the Spearman-Brown Prophecy Formula.

Item Analysis

For the item analysis, approximately the upper and lower 10% of the students' answers were utilized. The following formula was used to compute the discrimination index.

$$\frac{\Sigma X_U - \Sigma X_L}{\Sigma X_U \text{ (max.)}}$$

where ΣX_U is the total score of the upper group, ΣX_L is the total score of the lower group, and $\Sigma X_{U(max.)}$ is the theoretical maximum of the upper group.

TABLE II

Summary of Test Statistics

Groups	r_{tt}	r_{xy}	s	s_e	$\overline{X}$	n
Master of Business	0.99	0.98	32.17	3.60	66.42	12
Psychology 201	0.98	0.96	31.85	4.41	60.44	90
Life Science 112	0.98	0.95	27.70	4.38	65.07	55
Speech 101	0.97	0.95	25.43	4.25	58.39	76
Mathematics 104	0.97	0.94	24.20	4.12	57.35	49
Business Law 363	0.96	0.92	19.21	3.66	48.80	30
All Combined	0.98	0.95	27.80	4.28	59.38	312

where

r_{tt} = test reliability

r_{xy} = odd-even halves correlation

s = standard deviation

s_e = standard error of measurement

$\overline{X}$ = mean

n = number of subjects

For easy references, the frequency distribution of discrimination indices is tabulated in Table III.

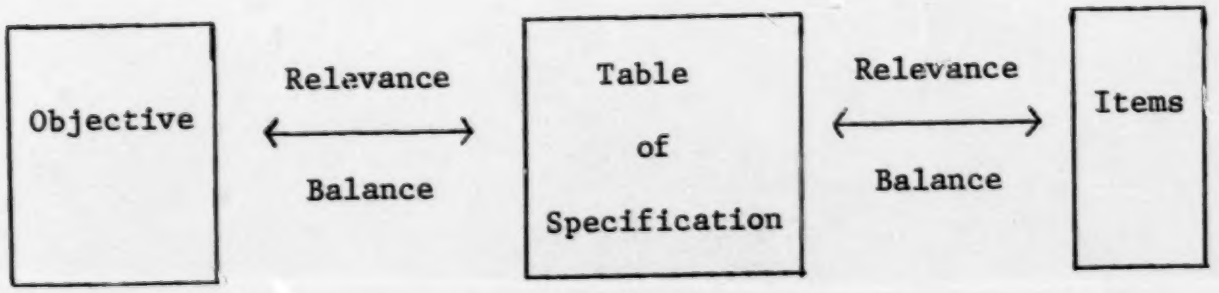
TABLE III

Frequency of Discrimination Indices

Discrimination Indices	Number of Items
above 0.800	2
0.700 - 0.799	13
0.600 - 0.699	15
0.500 - 0.599	4
0.400 - 0.499	2
0.300 - 0.399	2

Validity

Great care has been exercised in building validity into the test. Test items were selected on the basis of their relevance and balance to the objective of the test.



Before administering the test, it was content-validated by two professors in the Department of Speech at Indiana State University.

The test was also subjected to factor analysis which was "probably the most commonly used technique to establish construct validity.

Many writers, in fact, designate factorial validity, defined as the loading of the test on the factor (construct) of concern, as a specific and major type of validity." (Brown, 1970:147) The principle-factor technique was employed to extract the underlying factors. Four factors (Table IV) were extracted with their eigen values of 18.62, 1.90, 1.22, 1.09. This indicates that the first factor is accounting for 49 percent of the total test variance, and that each of the remaining factors accounted for approximately 2 to 5 percent of the variance. Since all the 38-items loaded heavily on the first factor, it can be concluded that the test is factorially "pure" and unidimensional. In other words, all the items are measuring the same construct. In addition to this, since many of the items in the test refer directly to attitudes toward ITV, it can be concluded that the underlying factor extracted is relevant to the purpose of the test, and construct validity is thus established.

Conclusions

The purpose of this study is to develop a reliable and valid instrument to measure students' expressed attitude toward Instructional Television. Results of the test analysis seem to indicate that this purpose is achieved. Although the subjects used in this study are all college students, it seems that this instrument is equally applicable to students of different academic levels. Perhaps with more field testing and experimentation, the academic levels of students suitable for this scale can be more accurately determined.

TABLE IV

The First Four Principle Components

Test Items	Principle Components			
	1	2	3	4
1	.761	-.108	-.193	.063
2	.652	.390	.002	-.124
3	.751	.136	-.092	-.230
4	.786	.145	-.059	-.106
5	.717	.279	-.145	-.267
6	.646	.421	-.051	-.179
7	.577	-.034	.155	-.204
8	.802	-.091	-.103	.072
9	.723	-.096	-.244	.140
10	.724	.215	-.004	-.016
11	.671	-.086	-.166	-.229
12	.572	-.230	.170	-.352
13	.774	-.132	-.287	.043
14	.750	-.246	-.144	.006
15	.806	-.172	-.114	.028
16	.679	-.174	-.038	-.162
17	.763	-.018	-.020	-.056
18	.620	.200	.023	.263
19	.429	.462	-.177	.191
20	.643	-.413	-.073	-.007
21	.748	-.255	-.014	.104
22	.682	.152	-.128	-.057
23	.622	.464	.146	-.016
24	.735	.356	.107	-.096
25	.749	.107	-.026	-.029
26	.585	-.190	.418	-.129
27	.686	.071	.331	.158
28	.846	-.101	-.115	-.049
29	.776	-.150	.033	.051
30	.685	-.172	.361	-.158
31	.484	-.285	.241	-.041
32	.704	.053	.259	-.061
33	.789	-.075	.129	.200
34	.524	.044	.399	.320
35	.830	-.218	-.096	.068
36	.624	.[illegible]8	.121	.347
37	.702	-.040	.005	.337
38	.745	-.153	-.204	.190
Eigen values	18.618	1.903	1.225	1.087
Percent of Variance	48.995	5.008	3.223	2.860

APPENDIX

THE MEASURING INSTRUMENT

STUDENT ATTITUDE TOWARD INSTRUCTIONAL TELEVISION (ITV)

DIRECTIONS: The following is a list of statements concerning your attitude toward Instructional Television (ITV) in this University. Each statement is followed by five choices:

"a" for strongly agree

"b" agree

"c" uncertain

"d" disagree

"e" strongly disagree

You are requested to select your choice for each item by marking with your pencil the corresponding letters "a", "b", "c", "d", or "e".

Since this is not a test of your knowledge, there is no right or wrong answers. As we are interested in your opinion, do not hesitate to put down how you feel about each item. Your answer will be treated confidentially. Don't write down your name, just answer all questions and return it to your instructor. If you don't understand a question, ask someone for help.

Please check all responses on the IBM answer sheet provided.

1. I am very fond of ITV lessons.....(a.b.c.d.e.)
2. I don't think that a course taught by ITV can be effective.....
3. If I have the choice, I would never enroll again in an ITV class.....
4. I propose that the number of ITV courses should be reduced.....
5. It is a waste of money to enroll in an ITV course..
6. Lessons taught by ITV can seldom be as good as those taught in real

those taught in regular classes.....(a.b.c.d.e.)

7. Teaching by ITV should only be used when there are not enough teachers.....

8. Courses taught by ITV make me very eager to learn...

9. ITV courses often make things easier for me to remember.....

10. Classes taught by ITV are very boring.....

11. I would tell my friends the usefulness of ITV.....

12. ITV classes ignore individual differences in the classroom.....

13. I remember much better things taught by ITV than by regular class instruction.....

14. I think that I learn much better in a class taught by ITV than in a regular class taught by the same teacher.....

15. More subjects should be taught by ITV.....

16. It is a good sign to see more and more schools equipped with ITV.....

17. I would advise my friends not to take a course by ITV if they have the choice.....

18. Courses by ITV make it difficult for me to know what is happening in the lesson.....

19. No one can learn from ITV classes.....

20. ITV provides the best classroom atmosphere.....

21. ITV is much more effective than conventional teaching.....

22. On the whole, ITV has been more helpful than harmful to the students.....

23. We should not spend money to develop ITV.....(a.b.c.d.e.)

24. ITV should not be used in the classroom.....

25. ITV is an asset to the students.....

26. Teacher-pupil relationship is lost in a class taught by ITV.....

27. ITV causes students to be restless during class.....

28. I like very much to be taught by ITV.....

29. Students should be encouraged to take ITV courses...

30. ITV is too impersonal.....

31. Classes taught by ITV help to develop a sound relationship between the student and classroom teacher..

32. Courses taught by ITV causes students to be less interested in their work.....

33. Regular classroom teaching is much more effective than teaching by ITV.....

34. Many things cannot be taught effectively by ITV.....

35. I would like to take more courses in ITV if I have the choice.....

36. ITV has brought more resources to the classroom.....

37. Superior instruction is given by courses taught by ITV.....

38. I learn much faster in ITV courses.....

Scoring Key

1 +	11 +	21 +	31 +
2 -	12 -	22 +	32 -
3 -	13 +	23 -	33 -
4 -	14 +	24 -	34 -
5 -	15 +	25 +	35 +
6 -	16 +	26 -	36 +
7 -	17 -	27 +	37 +
8 +	18 -	28 +	38 +
9 +	19 -	29 +	
10 -	20 +	30 -	

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